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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,449	03/28/2005	Kazuyuki Yamane	10936-84	8257

24256 7590 06/04/2007
DINSMORE & SHOHL, LLP
1900 CHEMED CENTER
255 EAST FIFTH STREET
CINCINNATI, OH 45202

EXAMINER

TOSCANO, ALICIA

ART UNIT	PAPER NUMBER
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1712

MAIL DATE	DELIVERY MODE
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06/04/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/529,449	Applicant(s) YAMANE ET AL.	
	Examiner Alicia M. Toscano	Art Unit 1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,5,7-11,16-18 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,7-11,16-18 and 20-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 1, 4, 5, 7, 8, 9, 10, 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsumoto (JP 2001/323056).

Masumoto includes elements as previously set forth in the action dated 2/2/07. Use of polyglycolic acid is disclosed in [0009]. The MW of the starting polymer is between 50,000-300,000 [0010]. Since the compositional components have been met, namely the MW of the polyglycolic acid and the amount of added bis-oxazoline, it is the Examiners position that a MW increase of at least 35%, the property requirements of T2-T1, a PDI of 1.9 and an end MW of 150,000 would be inherent in the composition.

Remarks:

Applicants argue that Masumoto is drawn to end capping the polyester and not to chain extending. Applicants argue a high MW starting material is used as a starting material, not that its molecular weight is highly increased by a chain lengthening reaction. Applicants further draw arguments and calculations relating to the specific viscosity and through said calculations draw the conclusion that chain lengthening is not happening in Masumoto. Applicants argue Masumoto discloses only a short kneading period of the 2 elements and therefore the carboxyl end groups are only terminated and not linked between 2 molecules.

Examiner disagrees. Though Masumoto is drawn to end capping it is the Examiners position that the reaction of Masumoto inherently encompasses chain extending between adjacent molecules. Masumoto does not disclose stopping the reaction prior to completion. Thusly the composition of Masumoto is reacted for a time sufficient to react or utilize all of the bisoxazoline monomer. As such the MW increase must be inherent in Masumoto. Examiner requests data to the contrary. Regarding Masumoto starting with high MW polymers, this is moot since Masumoto discloses a MW of 50,000, or a "low MW polyester" as exemplified by Applicants Claim 5. Applicants arguments and calculations relating to the specific viscosity are not convincing. There is no way to know what the MW difference is when comparing 2 specific viscosities. That only the carboxyl groups are terminated and the MW has not increased is only speculation, Masumoto does not disclose stopping the reaction prior to completion. Applicants composition and reaction are identical to Masumoto and as such the composition of Masumoto must inherently increase in MW. As such, the rejection stands.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 11, 16, 17, 18, 20, 23, 24, 25, 26, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto.

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Matsumoto includes elements as set forth above. As set forth previously, the time of reaction dictates the crosslink density and thusly the MW of the product. The MW dictates the overall properties of the resin. High MW will yield better strength and mechanical properties than low MW whereas too high of a MW will lead to difficulties with molding.

It would have been obvious to one of ordinary skill in the art at the time of the invention to tailor the reaction time in order to achieve the desired crosslink density, or MW, of the polylactic acid in order to create articles with superior molding properties, meeting the requirements of newly amended Claim 11.

Remarks:

Applicants argue the short time of reaction of Matsumoto allows for end capping but not for chain extending.

Examiner disagrees. Masumoto carries his reaction to completion. Thusly the same reaction is happening for both applicants and Matsumoto. The above Claims require a reaction time of 10-30 minutes at a temperature less than 300C. The time and the temperature of a reaction are result effective variables. Increasing temperature decreases the reaction time whereas increasing the temperature decreases the reaction time. Further, the properties of the end resin will depend on the rate of the reaction. Fast reactions do not allow for chains to fully relax/integrate and will yield different crosslink density and MW increase than slow reactions. Thusly, fast vs. slow reaction

times will affect the crosslink density, the overall MW and mechanical properties of the resin.

3. Claims 1, 4, 5, 7, 8, 9-11, 16, 17, 18 and 20-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonsignore in view of Matsumoto.

Bonsignore includes elements as set forth in the action dated 2/2/07. Bonsignore discloses the use of polyglycolic acid as previously set forth. Bonsignore discloses the starting MW to be between 2,000-15,000. Bonsignore does not disclose the use of at least 30,000 MW PGA as a starting material.

Matsumoto includes elements as set forth above. Matsumoto discloses the use of PLA or PGA of MW 50,000-400,000 since this MW range results in superior physical properties.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in Bonsignore the use of a MW of 50,000 to 400,000, as taught by Matsumoto, in order to create articles with superior physical properties.

The start range of at least 30,000 and the end range of at least 150,000 lies within this range.

Bonsignore does not include the use of a specific bis-oxazoline nor the amount of bis-oxazoline useful to create high molecular weight polylactic acid. Matsumoto discloses the use of 0.5-2 wt% 2,2'-m-phenylene bis(2-oxazoline) [0021], Examples, Table 1. 2,2'-m-phenylene bis(2-oxazoline) is preferred because of its stability with the

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polyester resin [0021], and the amount used is preferred so as to minimize the amount of unreacted bis-oxazoline in the composition [0021].

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in Bosignore the use of 0.5-2 wt% of 2,2'-m-phenylene bis(2-oxazoline), as taught by Matsumoto, since this amount of said species is taught to have superior stability in the resin and this would thusly lead to a superior end product.

Bosignore does not disclose the reaction time. The time of reaction will dictate the crosslink density and thus the molecular weight of the polylactic-co-oxazoline product. The molecular weight of the polylactic acid dictates the overall properties of the resin. Higher molecular weight will yield better strength and mechanical properties than low molecular weight polymer however too high of a molecular weight will lead to difficulties with molding.

It would have been obvious to one of ordinary skill in the art at the time of the invention to tailor the reaction time of Bosignore in order to achieve the desired crosslink density, or molecular weight, of the polylactic acid in order to create articles with superior molding properties.

As the compositional requirements are met the Examiner finds the MW increase and further properties such as PDI, T2-T1 difference and weight loss starting temperature required by the Claims to be inherent.

Remarks:

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Applicants argue Bonsignore does not include all elements of the newly amended claims. Examiner agrees and modifies the rejection to include the teachings of Matsumoto. Applicant further argues Bonsignore does not disclose polyglycolic acid. Examiner disagrees. The previous rejection set forth both PLA and PGA. Applicant argues Bonsignore does not disclose the reaction conditions and thusly one does not know if chain lengthening, as claimed, is achieved. Examiner disagrees. The deficiencies of Bonsignore are made up for by the teachings of Matsumoto. Bonsignore and Matsumoto meet the compositional requirements and thusly must meet the chain lengthening requirements. Applicant argues Bonsignore teaches long reaction times under mild conditions. Examiner disagrees. Applicant draws this conclusion based on other coupling agents, not the bisoxazoline monomer. Thusly the argument is moot. Further, the time and temperature of the reaction are result effective variables. One would increase temperature to decrease reaction time and vice versa. Bonsignore teaches chain lengthening via bisoxazolines. Optimizing time and temperature is obvious to one of ordinary skill in the art as set forth above under Remarks of Matsumoto. Applicant argues the MW increase of greater than 150,000 is not disclosed in Bonsignore as Bonsignore prefers a MW range of 50K-100K. Examiner disagrees. Bonsignore prefers a range of 50K to 100K however discloses a high molecular weight polymer to be any MW above 25000. Further, the MW of greater than 150000 is met by the range of Matsumoto. Regarding the combination of Bonsignore and Matsumoto Applicants argue there is no teaching or suggestion by Matsumoto or Bonsignore to employ the bisoxazoline compound of Matsumoto and the amount of bisoxazoline of

Matsumoto with Bonsignore. Examiner disagrees. The motivation is as set forth above and in the action dated 2/2/07.

Conclusion

4. Applicant's arguments filed 5/2/07 have been fully considered but they are not persuasive. See above.
5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

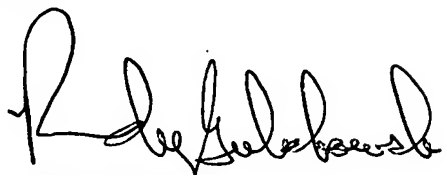
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alicia M. Toscano whose telephone number is 571-272-2451. The examiner can normally be reached on Monday to Friday 8:30 AM to 5 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AMT



RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700